Baxter

DIANEAL PD-2 Peritoneal Dialysis Solution

Ambu-Flex III Container For Peritoneal Dialysis

For intraperitoneal administration only

Description

Dianeal PD-2 peritoneal dialysis solutions in **Ambu-Flex** III containers with a flanged port are sterile, nonpyrogenic solutions for intraperitoneal administration only. They contain no bacteriostatic or antimicrobial agents or added buffers.

Composition, calculated osmolarity, pH, and ionic concentrations are shown in Table 1.

Potassium is omitted from **Dianeal** solutions because dialysis may be performed to correct hyperkalemia. In situations in which there is a normal serum potassium level or hypokalemia, the addition of potassium chloride (up to a concentration of 4 mEq/L) may be indicated to prevent severe hypokalemia. **Addition of potassium chloride should be made after careful evaluation of serum and total body potassium and only under the direction of a physician.** Frequent monitoring of serum electrolytes is indicated.

Because average plasma magnesium levels in some chronic CAPD patients have been observed to be elevated (Nolph et al. 1981), the magnesium concentration of this formulation has been reduced to 0.5 mEq/L. Average plasma magnesium levels have not been reported for chronic IPD and CCPD patients. Serum magnesium levels should be monitored and if low, oral magnesium supplements, oral magnesium containing phosphate binders, or peritoneal dialysis solutions containing higher magnesium concentrations may be used.

Because average serum bicarbonate levels in some chronic CAPD patients (Nolph et al. 1981), some chronic IPD patients (La Greca et al. 1980), and some chronic CCPD patients (Diaz-Buxo et al. 1983) have been observed to be somewhat lower than normal values, the bicarbonate precursor (lactate) concentration of this formulation has been raised to 40 mEq/L. Serum bicarbonate levels should be monitored.

The osmolarities shown in Table 1 are calculated values. As an example, measured osmolarity by freezing point depression determination of **Dianeal** PD-2 peritoneal dialysis solution with 1.5% dextrose is approximately 334 mOsmol/L, compared with measured values in normal human serum of 280 mOsmol/L.

The plastic container is fabricated from a specially formulated polyvinyl chloride (**PL 146** Plastic). The amount of water that can permeate from inside the container into the overwrap is insufficient to affect the solution significantly. Solutions in contact with the plastic container can leach out certain of its chemical components in very small amounts within the expiration period, e.g., di-2-ethylhexyl phthalate (DEHP), at not more than 0.4 parts per million. This level is well below the daily, tolerable intake level established by the FDA for DEHP. Biological testing supports the safety of the plastic container materials.

Clinical Pharmacology

Peritoneal dialysis is a procedure for removing toxic substances and metabolites normally excreted by the kidneys, and for aiding in the regulation of fluid and electrolyte balance.

The procedure is accomplished by instilling peritoneal dialysis fluid through a conduit into the peritoneal cavity. With the exception of lactate, present as a bicarbonate precursor, electrolyte concentrations in the fluid have been formulated to attempt to normalize plasma electrolyte concentrations resulting from osmosis and diffusion across the peritoneal membrane (between the plasma of the patient and the dialysis fluid). Toxic substances and metabolites, present in high concentrations in the blood, cross the peritoneal membrane into the dialyzing fluid. Dextrose in the dialyzing fluid is used to produce a solution hyperosmolar to the plasma, creating an osmotic gradient which facilitates fluid removal from the patient's plasma into the peritoneal cavity. After a period of time (dwell time), the fluid is drained by gravity from the cavity.

Indications and Usage

Peritoneal dialysis is indicated for patients in acute or chronic renal failure when nondialytic medical therapy is judged to be inadequate (Vaamonde and Perez 1977). It may also be indicated in the treatment of certain fluid and electrolyte disturbances, and for patients intoxicated with certain poisons and drugs (Knepshield et al. 1977). However, for many substances other methods of detoxification have been reported to be more effective than peritoneal dialysis (Vaamonde and Perez 1977; Chang 1977).

Contraindications

None known

Warnings

Peritoneal dialysis should be done with great care, if at all, in patients with a number of abdominal conditions including disruption of the peritoneal membrane or diaphragm by surgery or trauma, extensive adhesions, bowel distention, undiagnosed abdominal disease, abdominal wall infection, hernias or burns, fecal fistula or colostomy, tense ascites, obesity, and large polycystic kidneys (Vaamonde and Perez 1977). Other conditions include recent aortic graft replacement and severe pulmonary disease. When assessing peritoneal dialysis as the mode of therapy in such extreme situations, the benefits to the patient must be weighed against the possible complications.

An accurate fluid balance record must be kept and the weight of the patient carefully monitored to avoid over or under hydration with severe consequences including congestive heart failure, volume depletion, and shock.

Excessive use of **Dianeal** PD-2 peritoneal dialysis solution with 3.5% or 4.25% dextrose during a peritoneal dialysis treatment can result in significant removal of water from the patient.

In acute renal failure patients, plasma electrolyte concentrations should be monitored periodically during the procedure. Stable patients undergoing maintenance peritoneal dialysis should have routine periodic evaluation of blood chemistries and hematologic factors, as well as other indicators of patient status.

Because average plasma magnesium levels in chronic CAPD patients have been observed to be elevated (Nolph et al. 1981), the magnesium concentration of this formulation has been reduced to 0.5 mEq/L. Average plasma magnesium levels have not been reported for chronic IPD and CCPD patients. Serum magnesium levels should be monitored and if low, oral magnesium supplements, oral magnesium containing phosphate binders, or peritoneal dialysis solutions containing higher magnesium concentrations may be used.

Because average serum bicarbonate levels in some chronic CAPD patients (Nolph et al. 1981), some chronic IPD patients (La Greca et al. 1980), and some chronic CCPD patients (Diaz-Buxo et al. 1983), have been observed to be somewhat lower than normal values, the bicarbonate precursor (lactate) concentration of this formulation has been raised to 40 mEq/L. Serum bicarbonate levels should be monitored.

Not for use in the treatment of lactic acidosis.

Potassium is omitted from **Dianeal** PD-2 solutions because dialysis may be performed to correct hyperkalemia. **Addition of potassium chloride should be made after careful evaluation of serum and total body potassium and only under the direction of a physician.**

The use of 5 or 6 liters of dialysis solution is not indicated in a single exchange.

Do not use 6 liter product with Pac-X or Pac-Xtra hardware.

Refer to manufacturer's directions accompanying drugs to obtain full information on additives.

If the resealable rubber plug on the medication port is missing or partially removed, do not use product if medication is to be added.

After removing overwrap, check for minute leaks by squeezing container firmly. If leaks are found, discard the solution because the sterility may be impaired.

Freezing of solution may occur at temperatures below 0°C (32°F). Do not flex or manipulate container when frozen. Allow container to thaw naturally in ambient conditions and thoroughly mix contents by shaking.

Precautions

Aseptic technique must be used throughout the procedure and at its termination in order to reduce the possibility of infection. If peritonitis occurs, the choice and dosage of antibiotics should be based upon the results of identification and sensitivity studies of the isolated organism(s) when possible. Prior to identification of the involved organism(s), broad-spectrum antibiotics may be indicated.

Peritoneal dialysis solutions may be warmed in the overpouch to 37°C (98.6°F) to enhance patient comfort. However, only dry heat (for example, heating pad) should be used. Solutions should not be heated in water due to an increased risk of infection. Microwave ovens should not be used to heat solutions because there is a potential for damage to the solution container. Moreover, microwave oven heating may potentially cause overheating and/or non-uniform heating of the solution that may result in patient injury or discomfort.

Significant losses of protein, amino acids and water soluble vitamins may occur during peritoneal dialysis. Replacement therapy should be provided as necessary.

Pregnancy: Teratogenic Effects Pregnancy Category C. Animal reproduction studies have not been conducted with **Dianeal** peritoneal dialysis solutions. It is also not known whether **Dianeal** peritoneal dialysis solutions can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. **Dianeal** peritoneal dialysis solutions should be given to a pregnant woman only if clearly needed.

Do not administer unless solution is clear and seal is intact.

Adverse Reactions

Adverse reactions to peritoneal dialysis include mechanical and solution related problems as well as the results of contamination of equipment or improper technique in catheter placement. Abdominal pain, bleeding, peritonitis, subcutaneous infection around a chronic peritoneal catheter, catheter blockage, difficulty in fluid removal, and ileus are among the complications of the procedure. Solution related adverse reactions may include electrolyte and fluid imbalances, hypovolemia, hypervolemia, hypertension, hypotension, disequilibrium syndrome, and muscle cramping.

Dosage and Administration

Dianeal PD-2 solutions are intended for intraperitoneal administration only.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration whenever solution and container permit.

The mode of therapy (Intermittent Peritoneal Dialysis [IPD], Continuous Ambulatory Peritoneal Dialysis [CAPD], or Continuous Cyclic Peritoneal Dialysis [CCPD]), frequency of treatment, formulation, exchange volume, duration of dwell, and length of dialysis should be selected by the physician responsible for and supervising the treatment of the individual patient.

To avoid the risk of severe dehydration and hypovolemia and to minimize the loss of protein, it is advisable to select the peritoneal dialysis solution with the lowest level of osmolarity consistent with the fluid removal requirements for that exchange.

Peritoneal dialysis solutions may be warmed in the overpouch to 37°C (98.6°F) to enhance patient comfort. However, only dry heat (for example, heating pad) should be used. (See Directions for Use)

The addition of heparin to the dialysis solution may be indicated to aid in prevention of catheter blockage in patients with peritonitis, or when the solution drainage contains fibrinous or proteinaceous material (Ribot et al. 1966). 1000 to 2000 USP units of heparin per liter of solution has been recommended for adults (Furman et al. 1978). For children, 50 units of heparin per 100 mL of dialysis fluid has been recommended (Irwin et al. 1981).

Additives may be incompatible. Complete information is not available. Those additives known to be incompatible should not be used. Consult with pharmacist, if available. If, in the informed judgement of the physician, it is deemed advisable to introduce additives, use aseptic technique. Mix thoroughly when additives have been introduced. Do not store solutions containing additives.

Intermittent Peritoneal Dialysis (IPD)

For maintenance dialysis of chronic renal failure patients

The cycle of instillation, dwell and removal of dialysis fluid is repeated sequentially over a period of hours (8 to 36 hours) as many times per week as indicated by the condition of the patient. For chronic renal failure patients, maintenance dialysis is often accomplished by periodic dialysis (3 to 5 times weekly) for shorter time periods (8 to 14 hours per session) (Mattocks and El-Bassiouni 1971).

Continuous Ambulatory Peritoneal Dialysis (CAPD) and Continuous Cyclic Peritoneal Dialysis (CCPD)

For maintenance dialysis of chronic renal failure patients

In CAPD, 1.5 to 3.0 liters of dialysis solution (depending upon patient size) are instilled into the peritoneal cavity of adults and the peritoneal access device is then clamped (Kim et al. 1984; Twardowski and Janicka 1981; Twardowski and Burrows 1984). For children, 30 to 50 mL/kg body weight with a maximum of 2 liters has been recommended (Potter et al. 1981; Irwin et al. 1981). The solution remains in the cavity for dwell times of 4 to 8 hours during the day and 8 to 12 hours overnight. At the conclusion of each dwell period, the access device is opened, the solution drained and fresh solution instilled. The procedure is repeated 3 to 5 times per day, 6 to 7 days per week. Solution exchange volumes and frequency of exchanges should be individualized for adequate biochemical and fluid volume control (Moncrief et al. 1982; Twardowski et al. 1983). The majority of exchanges will utilize 1.5% or 2.5% dextrose containing peritoneal dialysis solutions, with 3.5% or 4.25% dextrose containing solutions being used when extra fluid removal is required. Patient weight is used as the indicator of the need for fluid removal (Popovich et al. 1978).

In CCPD, the patient receives 3 or 4 dialysis exchanges during the night which range from 2-1/2 to 3 hours dwell duration. Typically 1.5 to 2.0 liters of dialysis solution (depending upon patient size) are delivered each cycle by an automatic peritoneal dialysis cycler machine. After the last outflow during the night, an additional exchange is infused by the cycler machine into the peritoneum. The equipment is then disconnected from the patient, and the dialysate remains in the peritoneum for 14 to 15 hours during the day until the next nocturnal cycle (Diaz-Buxo et al. 1981). Combinations of 1.5% or 2.5% dextrose containing peritoneal dialysis solutions are usually used for the nighttime exchanges, while 3.5% or 4.25% dextrose is used when extra fluid removal is required such as during the daytime exchange. Patient weight is used as the indicator of the need for fluid removal (Popovich et al. 1978) so therapy should be individualized according to the patient's need for ultrafiltration.

It is recommended that adult patients being placed on chronic peritoneal dialysis or, in the case of pediatric patients, the selected caretaker, (as well as the patient, when suitable), should be appropriately trained in a program which is under the supervision of a physician. Training materials are available from Baxter Healthcare Corporation, Deerfield, IL 60015, USA to facilitate this training.

How Supplied

Dianeal PD-2 peritoneal dialysis solutions in **Ambu-Flex** III containers are available in nominal size flexible containers with fill volumes and dextrose concentrations as indicated in Table 1.

All **Dianeal** PD-2 peritoneal dialysis solutions have overfills which are declared on container labeling.

Exposure of pharmaceutical products to heat should be minimized. Avoid excessive heat. It is recommended the product be stored at room temperature (25°C/77°F): brief exposure up to 40°C (104°F) does not adversely affect the product.

Directions for Use

Use aseptic technique.

For complete system preparation, see directions accompanying ancillary equipment.

Peritoneal dialysis solutions may be warmed in the overpouch to 37°C (98.6°F) to enhance patient comfort. However, only dry heat (for example, heating pad) should be used. Solutions should not be heated in water due to an increased risk of infection. Microwave ovens should not be used to heat solutions because there is a potential for damage to the solution container. Moreover, microwave oven heating may potentially cause overheating and/or non-uniform heating of the solution that may result in patient injury or discomfort.

To Open

Tear overwrap down side at slit and remove solution container. Some opacity of the plastic due to moisture absorption during the sterilization process may be observed. This is normal and does not affect the solution quality or safety. The opacity will diminish gradually. If supplemental medication is desired, follow directions below before preparing for administration. Check for minute leaks by squeezing container firmly.

To Add Medication

Additives may be incompatible.

If the resealable rubber plug on the medication port is missing or partially removed, do not use product if medication is to be added.

1. Prepare medication site.
2. Using a syringe with a 1 inch long 19 to 25 gauge needle, puncture resealable medication port and inject.
3. Position container with ports up and evacuate the medication port by squeezing and tapping it.
4. Mix solution and medication thoroughly.

Preparation for Administration

1. Place container on table or suspend from support (depending on technique).
2. Remove protector from outlet port of container.
3. Attach appropriate solution transfer set. Refer to complete directions in hardware manual and/or directions accompanying transfer set.

Discard unused portion.

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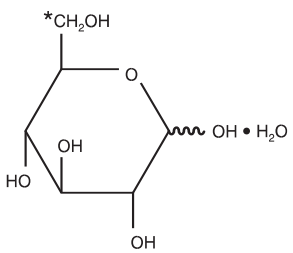
Table 1

	Composition/100 mL					**Osmolarity** (mOsmol/L) (calc)	**pH**	**Ionic Concentration** (mEq/L)					**How Supplied**			
	*Dextrose, Hydrous, USP	Sodium Chloride, USP ($NaCl$)	Sodium Lactate ($C_3H_5NaO_3$)	Calcium Chloride, USP ($CaCl_2 \cdot 2H_2O$)	Magnesium Chloride, USP ($MgCl_2 \cdot 6H_2O$)			Sodium	Calcium	Magnesium	Chloride	Lactate	Fill Volume (mL)	Container Size (mL)	Code	NDC
Dianeal PD-2 Peritoneal Dialysis Solution with 1.5% Dextrose	1.5 g	538 mg	448 mg	25.7 mg	5.08 mg	**346**	5.2 (4.0 to 6.5)	132	3.5	0.5	96	40	250 500 750 1000 1500 2000 2500 3000 5000 6000	500 1000 1000 1000 2000 2000 3000 3000 5000 6000	5B5160 5B5161 5B5162 5B5163 5B5165 5B5166 5B5168 5B5169 5B5193 5B9710	NDC 0941-0411-40 NDC 0941-0411-41 NDC 0941-0411-42 NDC 0941-0411-43 NDC 0941-0411-45 NDC 0941-0411-46 NDC 0941-0411-48 NDC 0941-0411-49 NDC 0941-0411-25 NDC 0941-0411-28
Dianeal PD-2 Peritoneal Dialysis Solution with 2.5% Dextrose	2.5 g	538 mg	448 mg	25.7 mg	5.08 mg	**396**	5.2 (4.0 to 6.5)	132	3.5	0.5	96	40	250 500 750 1000 1000 1500 2000 2500 3000 5000 6000	500 1000 1000 1000 2000 2000 3000 3000 3000 5000 6000	5B5170 5B5171 5B5172 5B5173 5B5174 5B5175 5B5177 5B5178 5B5179 5B5194 5B9711	NDC 0941-0413-40 NDC 0941-0413-41 NDC 0941-0413-42 NDC 0941-0413-43 NDC 0941-0413-44 NDC 0941-0413-45 NDC 0941-0413-47 NDC 0941-0413-48 NDC 0941-0413-49 NDC 0941-0413-25 NDC 0941-0413-28
Dianeal PD-2 Peritoneal Dialysis Solution with 3.5% Dextrose	3.5 g	538 mg	448 mg	25.7 mg	5.08 mg	**447**	5.2 (4.0 to 6.5)	132	3.5	0.5	96	40	2500	3000	5B4804	NDC 0941-0423-48
Dianeal PD-2 Peritoneal Dialysis Solution with 4.25% Dextrose	4.25 g	538 mg	448 mg	25.7 mg	5.08 mg	**485**	5.2 (4.0 to 6.5)	132	3.5	0.5	96	40	250 500 750 1000 1000 1500 2000 2500 3000 5000 6000	500 1000 1000 1000 2000 2000 3000 3000 3000 5000 6000	5B5180 5B5181 5B5182 5B5183 5B5184 5B5185 5B5187 5B5188 5B5189 5B5195 5B9712	NDC 0941-0415-40 NDC 0941-0415-41 NDC 0941-0415-42 NDC 0941-0415-43 NDC 0941-0415-44 NDC 0941-0415-45 NDC 0941-0415-47 NDC 0941-0415-48 NDC 0941-0415-49 NDC 0941-0415-25 NDC 0941-0415-28



Dextrose Hydrous, USP
(D-Glucopyranose monohydrate)

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